National Institute of Environmental Health Sciences

Response of streamflow to climate change and human activity in Xitiaoxi River Basin in China

Author(s): Zhang CQ, Zhang BA, Li WH, Liu MC
Year: 2014
Journal: Hydrological Processes. 28 (1): 43-50

Abstract:

In recent years, the Xitiaoxi river basin in China has experienced intensified human activity, including city expansion and increased water demand. Climate change also has influenced streamflow. Assessing the impact of climate variability and human activity on hydrological processes is important for water resources planning and management and for the sustainable development of eco-environmental systems. The non-parametric Mann-Kendall test was employed to detect the trends of climatic and hydrological variables. The Mann-Kendall-Sneyers test and the moving t-test were used to locate any abrupt change of annual streamflow. A runoff model, driven by precipitation and potential evapotranspiration, was employed to assess the impact of climate change on streamflow. A significant downward trend was detected for annual streamflow from 1975 to 2009, and an abrupt change occurred in 1999, which was consistent with the change detected by the double mass curve test between streamflow and precipitation. The annual precipitation decreased slightly, but upward trends of annual mean temperature and potential evapotranspiration were significant. The annual streamflow during the period 1999-2009 decreased by 26.19% compared with the reference stage, 1975-1998. Climate change was estimated to be responsible for 42.8% of the total reduction in annual streamflow, and human activity accounted for 57.2%.

Source: http://dx.doi.org/10.1002/hyp.9539

Resource Description

Communication: ☑

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

A focus of content

Other Communication Audience: Water resource manager

Exposure : ☑

weather or climate related pathway by which climate change affects health

Food/Water Security, Precipitation

Geographic Feature: ☑

resource focuses on specific type of geography

Freshwater

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: China

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment:

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content